

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Forest Insect and Disease Management Group
P. O. Box 5895, Asheville, N. C. 28803

REPLY TO: 5200

April 29, 1976

SUBJECT: Ocala Sand Pine Seed Orchard Evaluation



TO: Benjamin F. Finison, Forest Supervisor
NF in Florida

Attention: James C. Ouzts
Ocala NF

This letter contains information regarding an insect and disease detection survey of the Ocala Seed Orchard in November 1975 and a follow-up evaluation of tip moth and a seed potential evaluation of the orchard on March 24, 1976.

Larry Barber and Ed Cordell were able to meet and visit the seed orchard personnel in November 1975. Ed Cordell noted the only potential disease problem of any consequence in this young sand pine seed orchard is Clitocybe root rot. Sand pine is highly susceptible to this root disease and Clitocybe is widespread in Florida. Any noticeable browned or wilted needles, terminal mortality, or root rot symptoms should be reported to plant pathologists, FI&DM Group, Asheville, N. C.

In January 1976, Hoover Lambert and Larry Barber visited the seed orchard but were unable to complete a tip moth evaluation because of rain. They did however, collect 5 cones from each of 15 trees in the adjoining sand pine forest. These sand pine cones were taken to the Asheville Office where the seeds were extracted and x-rayed. Using a technique developed by Dr. David-L. Bramlett, SEFES, USFS, personnel of the Asheville Office dissected the cones to determine the seed potential of each cone. (Table 1.)

The seed potential is defined as two times the number of fertile cone scales and is the maximum number of seeds a cone is capable of producing. We determined that the seed potential for the Ocala race of sand pine is about 118 and is based on a survey of 75 cones. A later sample from the Withlacoochee Seed Orchard taken by Charles Chellman of the Florida Forest Service showed that based on a 15 cone sample, the Choctahatchee race of sand pine had a potential of about 125 seeds. (Table 2.)

Analysis of the radiographs of the extracted seed from these cones showed that the identifiable seed bug losses were 5.6% and 7.2% on the Ocala and Choctahatchee race respectively. (Table 3) The Ocala seed source had 75.5% full seed and 18.9% empty seed while the Choctahatchee source had 79.2% full seed and 13.6% empty seed for the samples taken. Most of the seed reported as empty were probably attacked by seed bug but the loss is not identifiable on radiographs.

The term seed efficiency means the ratio of full seed to the seed potential. This concept is very useful to the seed orchard manager as it can be used to measure achievement in the seed orchard. This 15 tree study indicated an average seed efficiency of .48 which is quite high. The data on Table 4 shows a seed efficiency range per tree of from .26 to .73. This indicates that as expected there was a high degree of variability between trees.

In reality seed orchards are never able to produce up to their seed potential because of various factors such as: seed bug, pollination, genetic and other environmental hazards. Bramlett feels that if a seed orchard has a seed efficiency of .57 that is about all that can be expected. Many loblolly seed orchards are now operating near the 15% level.

As the seed potential may vary somewhat between clones as it did between trees in this study, the potential should be established for each of the important clones in your seed orchard. This service is available from the Seed Lab in Macon, Georgia at a nominal charge.

On March 2, 1976, Larry Barber completed the tip moth evaluation of the seed orchard and the results are found in Table 5. The identifiable tip moth infestation was light with an average of only 6% of the trees showing an infestation on the 5 top tips. This figure is low probably because the tip moth larvae were in an early instar and the damage difficult to observe unless the terminals were dissected and that was not done. Other top terminals were observed to be distorted or twisted much the same as if a herbicide such as 2-4-D had drifted onto the trees. A record of this observation showed that 35% of the trees had 1 or more of the top 5 terminals twisted or distorted. Later examination of twisted tips in the Asheville Office showed that these tips almost invariably contained small larvae, probably early instar tip moth. These tips while being distorted or twisted had

not started to wilt or turn color to indicate the flagging that is one of the typical damage signs associated with tip moth. Also, little or no frass or insect webbing was observed. If this survey had been completed 2 or 3 weeks later, Mr. Barber feels that most of the twisted or distorted tips would have developed the typical flagging characteristics of tip moth attack.

If this loss of twisted or distorted tips were added to the known tip moth attack you would have 41% of the trees with 1 or more of the top 5 terminals affected.

With an apparent tip moth infestation of this level, it is conceivable that the population will increase during the spring and summer. Recommendations for control procedures are therefore attached, to be used at the discretion of the seed orchard manager.

Aphids were found on 41% of the trees. Many of the aphids were parasitized and lady bird beetle predators were present. The aphid population because of the predators and parasites present is not expected to greatly increase in size or cause a great amount of damage.

Mr. Barber observed that 29% of the trees had 1st year conelets present. The cone producing trees, had on the average 3.2 cones per tree. Cone production varied greatly between blocks as in block one, 52% of the trees had conelets present while in block four only 13% were producing conelets.

Deer damage to the terminals was observed on 12% of the trees.

Several of the newly formed conelets were found to be attacked by unknown insects and were dead or aborted. This attack may possibly be attributed to early tip moth feeding in the cone or stalk and seed bug attack.

Robert D. Wolfe

ROBERT D. WOLFE
Field Representative
Forest Insect & Disease Management Group

Encl.

RECOMMENDATIONS

1. Apply Thimet^(R) 10 g in early spring of 1977 for tip moth control to all trees in block 1-4 at the rate of 3 oz. per tree. The Thimet granules will be applied to the soil under the drip line and raked into the soil. Hay or straw should be applied over the Thimet to minimize exposure to wildlife. This material should be applied in January 1977.
2. For tip moth control through this summer, spray with Demethoate (cygon^(R) 2-E) at peak emergence per label instructions. Larry Barber will visit the Ocala Office on April 30, 1976 to discuss insect control and population monitoring procedures with Duek Denney and James Ouzts.
3. Block 5 should be set aside as a check area where no pesticides or fertilizers are applied. This will allow us to measure the effectiveness of any pesticide applications, and to measure any phytotoxic response that might result after a pesticide application.
4. No insect control recommendations are being made to control seed and cone insects. Control of cone worms and seed bugs will begin after the trees begin bearing cones in larger numbers.

Table 1

SAND PINE CONE SEED POTENTIAL

Ocala Race

Tree Number	Cone Sample					Average
	A	B	C	D	E	
1	86	130	142	102	92	110.4
2	94	94	152	116	74	106
3	92	82	108	70	124	95.2
4	158	118	112	114	148	130
5	134	154	142	92	148	134
6	76	84	128	112	122	104.4
7	136	140	100	118	122	123.2
8	140	150	138	142	126	139.2
9	128	158	130	158	94	133.6
10	129	88	110	120	118	112.4
11	102	98	140	146	92	115.6
12	148	144	126	148	88	130.8
13	114	92	120	142	118	117.2
14	138	126	120	106	88	115.6
15	130	74	88	142	72	101.2
Average:	120	116.7	124	122	108	118

SAND PINE SEED POTENTIAL

Choctahatchee Race

Table 2

<u>Cone #</u>	<u>Potential</u>
1	100
2	106
3	126
4	142
5	136
6	136
7	124
8	116
9	100
10	120
11	112
12	154
13	148
14	156
15	96
Average	<u>125</u>

X-RAY ANALYSIS

Table 3

Sand Pine Seed

Race	Total Number of Seed	Full Seed %	Seed Bug %	Empty %
Ocala	5578	75.5	5.6	18.9
Choctahatchee	457	79.2	7.2	13.6

SEED EFFICIENCY OF 75 SAND PINE CONES ON THE OCALA NATIONAL FOREST

Table 4

Tree	CONE					Average
	A	B	C	D	E	
1	.83	.38	.72	.17	.27	.48
2	.45	.57	.22	.41	.61	.42
3	.71	.57	.44	.41	.60	.56
4	.46	.72	.51	.75	.78	.64
5	.82	.86	.89	.54	.68	.73
6	.39	.26	.23	.29	.18	.26
7	.79	.59	.23	.32	.61	.42
8	.71	.56	.57	.42	.62	.57
9	.29	.56	.41	.55	.26	.43
10	.33	.41	.16	.43	.19	.30
11	.27	.34	.36	.72	.09	.39
12	.15	.58	.63	.43	.45	.44
13	.35	.36	.33	.27	.26	.31
14	.41	.57	.65	.62	.45	.55
15	.53	.20	.77	.62	.74	.58
Average	.46	.53	.46	.47	.46	.48

OCALA SAND PINE SEED ORCHARD SURVEY

March 24, 1976

Table 5

% Tips * Infested Tip Moth		% Trees Aphid Infested	% Trees Deer Broused	% Conelets Present	% Terminals * Twisted/Distorted
Block 1	7	48	3	52	38
2	7	46	18	21	40
3	4	45	10	28	24
4	3	27	17	13	40
Total for all blocks:					
	6	41	12	29	35

* 1 or more of the top 5 terminals affected.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.